

# Medical Devices to Teach Biomedical Engineering

Summer student project for May-August 2020, supervised by Dr. Chris Bouwmeester PEng

## Target Student Population(s)

Undergraduate student in Engineering Science, Mechanical Engineering, Electrical Engineering or Computer Engineering in years 1 – 3. Preference will be given to students with experience in biomedical engineering.

## Brief Project Description

The goal of this project is to give students taking an introductory course in biomedical engineering a hands-on way to measure their own physiological signals. I need a student to help me create a combined tonometer / pulse oximeter to detect changes in blood pressure, volume, and oxygen saturation or to create a device that can easily detect heart sounds and perform ballistocardiography. I want to give this device to a wide range of students using active learning spaces completing experiments designed to measure their vital signs. To realize this project, you will have full access to the [IBBME design studio](#).

## Expected Learning Outcomes

You will be expected to:

- Create a device that is capable of measuring combined vital signs
- Create online tutorials (video + text/images) that show how to use the device

## Expected Research Outcomes

Through this project you will be contributing to pedagogical research that aims to explore new ways of learning and improve the undergraduate student experience. You will be expected to present your work at the Undergraduate Engineering Research Day (UnNERD). Successful completion of the project will enable the student to receive joint authorship in a conference publication. Exemplary performance will involve studying the effectiveness of the BME-in-your-hand platform and active learning with various groups of users and potential publication in a leading engineering education publication.

## Required Skills

- Programming experience (Python, Matlab, etc.)
- Experience with electrical hardware (e.g., Arduino) and sensors that measure physiologic signals
- Experience with light fabrication (hand tools, soldering, etc.)
- Desire to build prototypes and utilize a maker space to rapidly create new designs

## Funding

Ideal candidates from the University of Toronto will have secured funding (e.g., the First-year Summer Fellowship, or the [Engineering Science Research Opportunities Program](#)).

## Application Details

Please use the application [form](#) provided

Updated: October 18, 2019